CLAIMS

1. A heat generator (10-14) with magneto-caloric material comprising at least one thermal element (Ti,) at least one magnetic element (Gi) for generating a magnetic field, said thermal element (Ti) being located opposite said magnetic element (Gi) so it can be subjected to at least one portion of said magnetic field, said heat generator (10-14) also comprising magnetic modulation means (Mj, mj) for varying the magnetic field received by said thermal element (Ti) and a means for recovering at least a portion of the thermies generated by said thermal element (Ti) subject to this variable magnetic field, characterized in that said magnetic modulation means comprises at least one magnetic modulation element (Mj, mj) that is magnetically conductive, coupled with a displacement means for alternately displacing it relative to said magnetic element (Gi) and to said thermal element (Ti) between an active position in which it is close to said magnetic element (Gi) and said thermal element (Ti) and channels at least the portion of said magnetic field that will be received by said thermal element (Ti), and an inactive position in which it is distanced from said magnetic element (Gi) and/or said thermal element (Ti) and has no effect on this portion of the magnetic field.
2. A heat generator (10, 11, 12, 14) according to claim 1 characterized in that said magnetic modulation element is a magnetic convergence element (Mj) made of a material with higher magnetic conductivity than the conductivity that exists in the ambient milieu separating said magnetic element (Gi) and said thermal element (Ti) and in that said magnetic convergence element (Mj), when in the active position, promotes the passage of said magnetic field toward said thermal element (Ti), resulting in an increase in the magnetic field crossing it.
3. A heat generator (10, 12, 13) according to claim 1 characterized in that said magnetic modulation element is a magnetic divergence element (mj) made of a material with higher magnetic conductivity than said thermal element (Ti), in that said magnetic divergence element (mj) has at least one shape that can bypass said thermal element (Ti) and designed so that in the active position, it

deflects at least one portion of said magnetic field from said thermal element (Ti), thereby weakening the magnetic field that crosses it.

4. A heat generator (10, 14) according to claim 1 characterized in that said magnetic modulation element (Mj, mj) is advantageously made of at least one of the materials selected from the group comprising soft iron, ferrites, iron alloys, chromium, vanadium, composites, nano-composites, permalloys.

5. A heat generator (10, 12) according to claims 2 and 3 characterized in that it comprises at least one magnetic convergence element (Mj) and at least one magnetic divergence element (mj) for alternately promoting passage of the magnetic field toward said thermal element (Ti) and deflecting said magnetic field from said thermal element (Ti).

6. A heat generator (10, 11, 12, 14) according to claim 1 characterized in that, at least in the active position, said magnetic modulation element (Mj, mj) is interposed between said magnetic element (Gi) and said thermal element (Ti).

7. A heat generator (10-14) according to claim 1 characterized in that said magnetic element (Gi) comprises at least one positive magnetic terminal (40) and at least one negative magnetic terminal (41), in that said thermal element (Ti) is located between said magnetic terminals (40, 41) and in that, at least in the active position, said magnetic modulation element (Mj, mj) is interposed between at least said magnetic terminals (40, 41).

8. A heat generator (10, 11, 12, 14) according to claims 2, 6 and 7 characterized in that said magnetic convergence element (Mj) comprises two convergence pellets (50) placed, when in the active position, on either side of said thermal element (Ti) between said thermal element (Ti) and said magnetic terminals (40, 41).

9. A heat generator (10, 12, 14) according to claims 3, 6 and 7 characterized in that said magnetic divergence element (mj) has a U-shape or C-shape (51), without shape limitation, designed to overlap, at least in the active position, said thermal element (Ti) between said thermal element (Ti) and said magnetic terminals (40, 41).

10. A heat generator (13) according to claims 3 and 7 characterized in that said magnetic divergence element (mj) comprises at least one contact (500) which is located, when in the active position, tangential to said thermal elements (Ti) and to said magnetic terminals (40, 41), with air-gap E which separates said thermal element (Ti) from said magnetic terminals (40, 41) remaining fee.

11. A heat generator (13) according to claim 10 characterized in that said air-gap (E) ranges from 0 mm to 50 mm and is preferably less than 1 mm.

12. A heat generator (10-14) according to claims 8 or 9 characterized in that said magnetic element (Gi) is U-shaped or C-shaped with no limitation in shape and designed to overlap said magnetic modulation element (Mj, mj).

13. A heat generator (10 -14) according to claim 1 characterized in that said displacement means is designed to drive said magnetic modulation element (Mj, mj) in at least one of the displacement modes selected from the group comprising continuous rotation, stepping rotation, alternate pivoting, continuous translation, stepping translation, alternate translation, or a combination of these displacement modes.

14. A heat generator (10 -13) according to claim 11 characterized in that said displacement means is coupled with an actuation means selected from the group consisting of a motor, a cylinder, a spring mechanism, an aerogenerator, an electromagnet, a hydrogenerator, or a manual mechanism.

15. A heat generator (10 -14) according to claim 1 characterized in that said magnetic modulation element (Mj, mj) is held by a support (52a-f) coupled with said displacement means and made of magnetically insulating material selected from the group consisting of synthetic materials, brass, bronze, aluminum, or ceramic.

16. A heat generator (10 -14) according to claim 14 characterized in that it comprises at least one unit of magnetic elements (Gi); one unit of thermal elements (Ti), each of which is designed to be subjected to the magnetic field from at least one of said magnetic elements (Gi); and one unit of magnetic modulation elements (Mj, mj) held by a support (52a-f) coupled with said

displacement means and designed to simultaneously displace said magnetic modulation elements (Mj, mj) so that each one of them is alternately in an active and an inactive position relative to a given thermal element (Ti) and a given magnetic element (Gi).

17. A heat generator (10 -13) according to claims 7 and 15 characterized in that said support comprises at least one generally circular platform (52a-d, 52f) rotationally movable about its axis, in that said thermal element s (Ti) are arranged in a ring, and in that said magnetic elements (Gi) form at least one pair of rims defining said positive magnetic terminals (40) and negative magnetic terminals (41).

18. A heat generator (10 -12) according to claim 17 characterized in that said platform (52a-d) is equipped with a groove (54a-d) defining the interval separating said convergence pellets (51) on said magnetic convergence elements (Mj) from one another and/or from the opening in said U-shaped or C-shaped portion (51) of said magnetic divergence elements (mj).

19. A heat generator (10, 11) according to claim 18 characterized in that said groove (54a, 54b) is disposed so as to be axial and essentially parallel to the axis of said platform (52a, 52b).

20. A heat generator (12) according to claim 16 characterized in that said groove (54c, 54d) is disposed so as to be radial and essentially perpendicular to the axis of said platform (52c, 52d).

21. A heat generator (14) according to claims 7 and 15 characterized in that said support comprises at least one generally rectilinear, translationally movable bar (52e), in that said thermal elements (Ti) are disposed along at least one line supported by a cross piece (70), and in that said magnetic elements (Gi) form at least one pair of rows defining said positive magnetic terminals (40) and negative magnetic terminals (41).

22. A heat generator (14) according to claim 21 characterized in that said thermal elements (Ti) are disposed along two generally parallel lines supported by two connected cross pieces (70) defining a frame (72).

23. A heat generator according to claim 16 characterized in that said magnetic elements are formed of one single piece.

24. A heat generator (10-14) according to claim 1 characterized in that said magnetic element is selected from the group comprising a magnetic assembly, a permanent magnet, an electromagnet, a superconductive magnet, a superconductive electromagnet, a superconductor.

25. A heat generator (10-14) according to claim 1 characterized in that said magnetic element (Gi) and said thermal element (Ti) are fixed and only the magnetic modulation element (Mj, mj) is movable.

26. A heat generator (10-14) according to claim 1 characterized in that said recovery means comprises at least one of the elements selected from the group comprising a transport circuit containing a heat-transmitting fluid, a circulation means for said heat-transmitting fluid, a heat exchanger.

27. A method of generating thermies in the course of which a magnetic field is created with at least one magnetic element (Gi), at least one thermal element (Ti) made of magneto-caloric material is subjected to at least one portion of said magnetic field, a magnetic modulation means (Mj, mj) is used to modulate said magnetic field received by said thermal element (Ti) and at least a portion of the thermies generated by said thermal element (Ti) subjected to said variable magnetic field is recovered, characterized in that in order to vary said magnetic field received by said thermal element (Ti), at least one magnetically-conductive magnetic modulation element (Mj, mj) is used, which is displaced between at least one active position wherein it is close to said magnetic element (Gi) and said thermal element (Ti) and channels at least said portion of the magnetic field that will be received by said thermal element (Ti), and an inactive position wherein it is distanced from said magnetic element (Gi) and/or said thermal element (Ti) so that it does not channel this portion of the magnetic field.

28. A method according to claim 27 characterized in that at least one magnetic element (Gi) is used, defining at least one positive terminal (40) and one negative terminal (41) between which said thermal element (Ti) is located,

and in that in the active position, said magnetic modulation element (Mj, mj) is interposed between at least said magnetic terminals (40, 41) on said magnetic element (Gi).